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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/482,162	01/12/2000	Kikuo Kaise	SON-1720	6631

7590 10/06/2003

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EXAMINER	
CHUNG, DAVID Y	

ART UNIT	PAPER NUMBER
2871	

DATE MAILED: 10/06/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application N .	Applicant(s)	
	09/482,162	KAISE ET AL.	
	Examin r	Art Unit	
	David Y. Chung	2871	

-- The MAILING DATE of this communication appears on the c ver sheet with the c rrespondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *31 July 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,6,8-17 and 19-26* is/are rejected.

7)☒ Claim(s) *5,7 and 18* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

1. Claims 1-4, 6, 8 and 22 rejected under 35 U.S.C. 102(b) as being anticipated by Sugata et al. (U.S. 4,568,149).

As to claims 1 and 22, Sugata et al. discloses a liquid crystal display panel having light-shielding regions formed above the gate or signal line. Note in figure 3(a), the pixel electrodes 4a-4d, the light-shielding region constituted by non-transmissive members 12, spacer members 6a-6d, and planarizing film 5a. The non-transmissive members 12 function as so-called "black stripes" in order to intensify color contrast between display units. The spacer members 6a-6d are formed in the light-shielding region as shown in figure 3(a). The spacer members are formed through the pixel electrodes 4a-4d as shown in figure 4(b). The spacer members abut against an

innermost surface of substrate 7 in order to define the given gap between the two substrates.

As to claims 2 and 3, Sugata et al. discloses that spacer members 6a-6d can be formed of the same or different material as that of insulating layer 5. See column 5, lines 40-43.

As to claim 4, figures 3(a) and 4(a) of Sugata et al. clearly show that the pixel electrodes 4a-4d are located on a flat surface of the insulating layer 5.

As to claim 6, figure 3(a) of Sugata et al. shows that the innermost surface of substrate 7 is provided with color filters 14a-14d.

As to claim 8, Sugata et al. discloses that the spacer members 6a-6d are preferably formed of inorganic compounds or organic resins of insulating property. See column 5, lines 23-28.

2. Claims 1, 3, 4, 8, 10, 22 and 23 rejected under 35 U.S.C. 102(b) as being anticipated by Kimura (U.S. 5,777,713).

As to claim 1, Kimura discloses a liquid crystal display unit with spacers formed in the light-shielding regions. Note in figure 3, the pixel electrode 112, opposing

electrode 114, first substrate 100, second substrate 116, spacers 6' and 10', planarizing film 108, and light-shielding region 118. The spacers 6' and 10' are formed through the pixel electrode film represented by layer 112. The spacers 6' and 10' are formed in the light-shielding region 118 and define the gap between the first substrate and second substrate.

As to claim 3, figure 3 of Kimura shows that the spacers 6' and 10' are formed of a material different from that of the planarizing film 108.

As to claim 4, figure 3 of Kimura shows that the pixel electrode 112 is located on a flat surface of planarizing film 112 not covered by spacers 6' and 10'.

As to claim 8, Kimura discloses that the spacers are formed of a resin material. See column 5, lines 41-60. Resins are organic materials.

As to claim 10, Kimura discloses that the planarizing film 112 is formed of silicon nitride, which is inorganic. See column 4, lines 45-50.

As to claim 23, Kimura discloses a liquid crystal light valve used in projection-type liquid crystal display units. See column 1, lines 5-34.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1, 2, 4, 6, 8, 9, 11-13, 15, 19, 20 and 22-24 rejected under 35 U.S.C. 103(a) as being unpatentable over Bruzzone et al. (U.S. 6,166,797) in further view of Jung (U.S. 6,300,987) and Koma (U.S. 5,666,179).

As to claims 1 and 22, Bruzzone et al. discloses a microstructured barrier layer comprising a plurality of microstructured spacing members that provide precise, uniform spacing between the first substrate element and a second substrate element. Note in figure 3B, the transparent electrodes 128, and the planarizing film 126 having a flat surface with projections 136 formed through the pixel electrodes. The first substrate 122B is bonded to the second substrate 122A by adhesive 132. The projections 136 define the given gap between the first substrate and second substrate. See column 8, lines 8-33.

Bruzzone et al. does not disclose a light-shielding region. Jung teaches that in a conventional liquid crystal display, the portion outside pixel electrodes is generally covered with a black matrix that is formed on one of two panels of the LCD. See column 1, lines 25-30. Koma teaches that in a conventional liquid crystal display, a

light-shielding region is formed in regions other than the region of the pixel electrode in order to improve contrast. See column 2, lines 44-49. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to form a light-shielding region in the device of Bruzzone et al., in the region outside of the pixel electrodes, in order to improve contrast. Since the projections in Bruzzone et al. are also formed in the region outside of the pixel electrodes, they would be located in the light-shielding region.

As to claim 2, Bruzzone et al. discloses projections 136 that are formed of the same material as that of planarizing film 126. See figure 3B.

As to claim 4, Bruzzone et al. discloses transparent electrodes 128 that are located on a flat surface of planarizing film 126 not covering projections 136 in a region corresponding to each pixel. See figure 3B.

As to claims 8 and 9, Bruzzone et al. discloses that the barrier layer comprising the projections 136 and planarizing layer 126 is preferably made of photosensitive acrylate. See column 9, lines 30-40. Acrylate is a specific type of acrylic resin.

As to claim 11, Bruzzone et al. in combination with Koma and Jung discloses all of the elements as discussed above regarding claim 1, except "preparing a first substrate and a second substrate" and "filling said given gap with a liquid crystal layer in

a hermetically sealed condition". However, it was well known that both of these steps were necessary. It was well known that the substrates had to be prepared by cleaning off any dust particles or other foreign matter before forming the display elements in order to prevent defects that would affect the reliability of the display from being introduced. It was well known that the gap between the substrates must be hermetically sealed before filling it with liquid crystal in order to prevent the liquid crystal from leaking out. Therefore, these steps would have been obvious to one of ordinary skill in the art at the time of invention because they were well known for being necessary in forming a working and reliable display.

As to claim 12, see above regarding claim 2.

As to claim 13, figure 3B of Bruzzone et al. shows the projections 136 and planarizing film 126 to be patterned from the same resin layer. Therefore, the step of forming the projections would be integral with the step of forming the planarizing film since they would both involve patterning the same resin layer.

As to claim 15, Bruzzone et al. in combination with Jung and Koma does not disclose forming the pixel electrodes after forming the planarizing film and projections but before bonding the first and second substrates. However, this was inherent. The planarizing film had to be formed before the pixel electrodes since the pixel electrodes are formed directly on top of the planarizing film. Since the step of forming the

projections is integral with the step of forming the planarizing film, the projections must also be formed before the pixel electrodes. All display elements had to be formed before bonding the first and second substrates because there was no way to form them once the substrates were sealed.

As to claims 19 and 20, see above regarding claims 8 and 9.

As to claim 23, Bruzzone et al. discloses that liquid crystal displays were useful in portable devices such as computers and projectors. See column 1, lines 30-35.

As to claim 24, Bruzzone et al. in combination with Jung and Koma does not disclose providing switching elements in the light-shielding region in order to energize the pixel electrodes. However, this was the case in a large class of liquid crystal display devices called active matrix liquid crystal displays. Active matrix liquid crystal displays were well known for their improved switching speed and response time over passive matrix displays. It would have obvious to one of ordinary skill in the art a the time of invention to provide switching elements such as thin film transistors to energize the individual pixel electrodes in order to improve the switching speed and response time of the display. It was well known to place the thin film transistors in the light-shielding region because light adversely affected them.

4. Claims 9-12, 14-17 and 19-21 rejected under 35 U.S.C. 103(a) as being unpatentable over Sugata et al. (U.S. 4,568,149).

As to claims 9 and 20, Sugata et al. does not disclose using acrylic resin to form the spacing members 6a-6d. Acrylic resin was well known for being an organic material having good insulating properties. It was also well known for being easy to pattern. Sugata et al. discloses that the spacing members are preferably formed of inorganic compounds or organic resins of insulating property. See column 5, lines 23-28. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to form the spacing members of Sugata et al. with acrylic resin because it had good insulating properties and was easy to pattern.

As to claims 10 and 21, Sugata et al. does not disclose forming the insulating layer of an inorganic material. However, insulating layers in electronic devices such as liquid crystal displays were typically made from inorganic material such as silicon oxide or silicon nitride since they could then be formed with well known, cost-effective methods such as sputtering or chemical vapor deposition (CVD). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to form the insulating layer of Sugata et al. using an inorganic material because it was cost-effective.

As to claim 11, Sugata et al. discloses all of the elements as discussed above regarding claim 1, except "preparing a first substrate and a second substrate" and "filling said given gap with a liquid crystal layer in a hermetically sealed condition". However, it was well known that both of these steps were necessary. It was well known that the substrates had to be prepared by cleaning off any dust particles or other foreign matter before forming the display elements in order to prevent defects that would affect the reliability of the display from being introduced. It was well known that the gap between the substrates must be hermetically sealed before filling it with liquid crystal in order to prevent the liquid crystal from leaking out. Therefore, these steps would have been obvious to one of ordinary skill in the art at the time of invention because they were well known for being necessary in forming a working and reliable display.

As to claims 12 and 14, Sugata et al. discloses that spacer members 6a-6d can be formed of the same or different material as that of insulating layer 5. See column 5, lines 40-43.

As to claim 15, Sugata et al. does not disclose forming the pixel electrodes after forming the insulating layer and spacing members but before bonding the first and second substrates. Forming the pixel electrodes before bonding the first and second substrates was inherent since there was no way to form display elements once the substrates were bonded. Forming the pixel electrodes after forming the insulating layer was inherent since the pixel electrodes are formed directly on top of the insulating layer.

It was well known that in the device of Sugata et al., the pixel electrodes could be formed before or after the spacing members without significantly affecting the manufacturing process or the finished display. This was simply a matter of design choice. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to form the pixel electrode after forming the spacing members because this was a matter of design choice.

As to claim 16, Sugata et al. does not disclose forming the pixel electrodes after forming the insulating layer and before forming the spacing members. Forming the pixel electrodes after forming the insulating layer was inherent since the pixel electrodes are formed directly on top of the insulating layer. It was well known that in the device of Sugata et al., the pixel electrodes could be formed before or after the spacing members without significantly affecting the manufacturing process or the finished display. This was simply a matter of design choice. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to form the pixel electrode before forming the spacing members because this was a matter of design choice.

As to claim 17, figure 3(a) of Sugata et al. shows that the innermost surface of substrate 7 is provided with color filters 14a-14d.

As to claim 19, Sugata et al. discloses that the spacer members 6a-6d are preferably formed of inorganic compounds or organic resins of insulating property. See column 5, lines 23-28.

5. Claims 11, 14-16 and 19-21 rejected under 35 U.S.C. 103(a) as being unpatentable over Kimura (U.S. 5,777,713).

As to claim 11, Kimura discloses all of the elements as discussed above regarding claim 1, except "preparing a first substrate and a second substrate" and "filling said given gap with a liquid crystal layer in a hermetically sealed condition". However, it was well known that both of these steps were necessary. It was well known that the substrates had to be prepared by cleaning off any dust particles or other foreign matter before forming the display elements in order to prevent defects that would affect the reliability of the display from being introduced. It was well known that the gap between the substrates must be hermetically sealed before filling it with liquid crystal in order to prevent the liquid crystal from leaking out. Therefore, these steps would have been obvious to one of ordinary skill in the art at the time of invention because they were well known for being necessary in forming a working and reliable display.

As to claim 14, figure 3 of Kimura shows that the spacers 6' and 10' are formed of a material different from that of the planarizing film 108.

As to claims 15, Kimura does not disclose forming the pixel electrodes after forming the planarizing film and spacers but before bonding the first and second substrates. Forming the pixel electrodes before bonding the first and second substrates was inherent since there was no way to form display elements once the substrates were bonded. Forming the pixel electrodes after forming the planarizing film was inherent since the pixel electrodes are formed directly on top of the planarizing film. It was well known that in the device of Kimura, the pixel electrodes could be formed before or after the spacers without significantly affecting the manufacturing process or the finished display. This was simply a matter of design choice. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to form the pixel electrode after forming the spacers because this was a matter of design choice.

As to claim 16, Kimura does not disclose forming the pixel electrodes after forming the planarizing film and before forming the spacers. Forming the pixel electrodes after forming the planarizing film was inherent since the pixel electrodes are formed directly on top of the planarizing film. It was well known that in the device of Kimura, the pixel electrodes could be formed before or after the spacers without significantly affecting the manufacturing process or the finished display. This was simply a matter of design choice. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to form the pixel electrode before forming the spacers because this was a matter of design choice.

As to claim 19, Kimura discloses that the spacers are formed of a resin material. See column 5, lines 41-60. Resins are organic materials.

As to claim 20, Kimura does not disclose the specific type of resin used to form spacers 6' and 10'. Acrylic resin was well known for being an organic material having good insulating properties. It was also well known for being easy to pattern. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to form the spacers of Kimura with acrylic resin because it had good insulating properties and was easy to pattern.

As to claim 21, Kimura discloses that the planarizing film 112 is formed of silicon nitride, which is inorganic. See column 4, lines 45-50.

6. Claims 6 and 17 rejected under 35 U.S.C. 103(a) as being unpatentable over Bruzzone et al. (U.S. 6,166,797) in further view of Jung (U.S. 6,300,987), Koma (U.S. 5,666,179) and Bahadur (Liquid Crystals 1990).

Bruzzone et al. in combination with Jung and Koma does not disclose a color filter or microlens array on the innermost surface of the second substrate. Bahadur discloses that a color filter is typically incorporated on the counter-side of the upper glass substrate in order to form a color display. See pp. 174-175. Bahadur discloses that the color filter layer is incorporated into the LC cell to avoid the parallax problem.

See p. 178. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to form a color filter on the innermost surface of the second substrate in order to form a color display that is free from parallax.

7. Claims 6 and 17 rejected under 35 U.S.C. 103(a) as being unpatentable over Kimura (U.S. 5,777,713) in further view of Bahadur (Liquid Crystals 1990).

Kimura does not disclose a color filter or microlens array on the innermost surface of the second substrate. Bahadur discloses that a color filter is typically incorporated on the counter-side of the upper glass substrate in order to form a color display. See pp. 174-175. Bahadur discloses that the color filter layer is incorporated into the LC cell to avoid the parallax problem. See p. 178. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to form a color filter on the innermost surface of the second substrate in order to form a color display that is free from parallax.

8. Claims 25 and 26 rejected under 35 U.S.C. 103(a) as being unpatentable over Bruzzone et al. (U.S. 6,166,797) in further view of Jung (U.S. 6,300,987), Koma (U.S. 5,666,179), and Sato et al. (U.S. 5,708,485).

Bruzzone et al. discloses a microstructured barrier layer comprising a plurality of microstructured spacing members that provide precise, uniform spacing between the

first substrate element and a second substrate element. Note in figure 3B, the transparent electrodes 128, and the planarizing film 126 having a flat surface with projections 136 formed through the pixel electrodes. The first substrate 122B is bonded to the second substrate 122A by adhesive 132. The projections 136 define the given gap between the first substrate and second substrate. See column 8, lines 8-33. Bruzzone et al. teaches addressing the pixel electrodes independently to create an electric field at selected pixels, which suggests an active matrix device having an independent switching element for each pixel electrode. See column 5, lines 63-65.

Bruzzone et al. does not disclose a light-shielding region. Jung teaches that in a conventional liquid crystal display, the portion outside pixel electrodes is generally covered with a black matrix that is formed on one of two panels of the LCD. See column 1, lines 25-30. Koma teaches that in a conventional liquid crystal display, a light-shielding region is formed in regions other than the region of the pixel electrode in order to improve contrast. See column 2, lines 44-49. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to form a light-shielding region in the device of Bruzzone et al., in the region outside of the pixel electrodes, in order to improve contrast. Since the projections in Bruzzone et al. are also formed in the region outside of the pixel electrodes, they would be located in the light-shielding region.

Bruzzone et al. in combination with Jung and Koma does not disclose a light-shielding region electrically connected to the drain electrode of a switching device and the pixel electrode. Sato et al. discloses an active matrix display having a light-shielding

film disposed in the layer between the thin film transistor and pixel electrode, which has an electric shield function and an electric contact function. Note mask shielding film 16M and pad shielding film 16P in figure 1. Sato et al. teaches that by forming the light-shielding films on the active substrate, it can be formed having minimal area, improving the transmissivity of the display. Further, because only the counter electrode needs to be formed on the counter substrate, cost of materials and manufacturing can be reduced. Sato et al. teaches that by maintaining mask shielding film 16M at a fixed potential, it can act as an electric shield for each pixel electrode and can suppress unwanted capacitive coupling between the switching device and pixel electrode, improving display quality. Sato et al. teaches that by interposing pad shielding film 16P between the pixel electrode and drain electrode, a good electrical connection between the pixel and drain electrode can be created. See column 6, lines 8-28. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to form a light-shielding layer as disclosed by Sato et al. in the display of Bruzzone et al. due to the aforementioned benefits. Furthermore, the light-shielding film of Sato et al. is adapted to act as an auxiliary retaining capacitor, as seen by the slight overlap between pixel electrode 6 and mask shielding film 16M in figure 1.

Response to Arguments

Applicant's arguments with respect to claims 1-24 have been considered but are moot in view of the new ground(s) of rejection.

Allowable Subject Matter

Claim 5 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: the prior art did not teach optimizing the end surface area of the projections in a manner relative to the area of the light-shielding region. Therefore, it would not have been obvious to make this end surface area to be ½ of the area of the light-shielding region.

Claims 7 and 18 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: the prior art did not teach the claimed structure of the element supplying common potential to both substrates. The prior art such as Fuji et al. taught a single column formed of conductive material, instead of an insulating spacer covered by a conductive film.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Chung whose telephone number is (703) 306-0155. The examiner can normally be reached on Monday-Friday from 8:30 am to 5:00 pm.

ROBERT H. KIM
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800

David Chung
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09/15/03